



VERIFICATION OF TRANSLATION

Re: JAPANESE PATENT APPLICATION NO.2002-319934

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hereby declare that I am the translator of the
document attached and certify that the following is
true translation to the best of my knowledge and
belief.

Signature of translator

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Dated this 23rd day of June, 2006



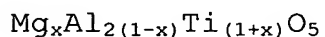
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[Document Name] Specification

[Title of the Invention] METHOD FOR PRODUCING ALUMINUM
MAGNESIUM TITANATE-BASED SINTERED PRODUCT

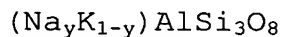
[Claims]

5 [Claim 1] A process for producing a sintered
body comprising as a basic component aluminum magnesium
titanate represented by the composition formula:



wherein the value of x is $0.25 \leq x < 0.75$,

10 the process comprising the step of sintering a
formed product from a raw material mixture comprising 100
parts by weight, calculated on an oxide basis, of a
mixture comprising an Mg-containing compound, an Al-
containing compound and a Ti-containing compound at the
15 same metal component ratio as the metal component ratio
of Mg, Al and Ti in the composition formula, and 1-10
parts by weight of an alkali feldspar represented by the
composition formula:



20 wherein the value of y is $0 \leq y \leq 1$ at a sintering
temperature of 1000-1700°C.

[Claim 2] An aluminum magnesium titanate-based
sintered body obtainable by the process of claim 1.

[Detailed Description of the Invention]

25 [0001]

[Technical Field to Which the Invention Pertains]

The present invention relates to a process for producing an aluminum magnesium titanate-based sintered product.

5 [0002]

[Prior Art]

Aluminum magnesium titanate is a solid solution which has a complete solubility in the solid state throughout the entire composition region of aluminum
10 titanate-magnesium titanate. A sintered body of the same has as low a coefficient of thermal expansion and as high a corrosion resistance as aluminum titanate sintered bodies. The melting point of aluminum magnesium titanate is, for example, about 1640°C in a sintered body in which
15 aluminum titanate and magnesium titanate are dissolved into each other at an approximately equivalent molar ratio. This temperature is lower than the melting point of aluminum titanate, about 1870°C, but is higher than the melting point of magnesium titanate, about 1600°C.
20 Therefore, in general, the heat-resistant high temperature limit of aluminum magnesium titanate is lower than that of aluminum titanate, but is higher than that of magnesium titanate.

[0003]

25 Aluminum titanate sintered bodies and magnesium

titanate sintered bodies are constructed from the crystal grains having the pseudobrookite type crystal structure, and their coefficients of thermal expansion are anisotropic. For this reason, displacement at the crystal grain boundary tends to be caused when heated or cooled and micro cracks and apertures may be formed, leading to disadvantageously lowered mechanical strength. Since aluminum magnesium titanate has similar disadvantages, the strength of aluminum magnesium titanate sintered body is also insufficient. Particularly when used for an application in which high temperatures and heavy loads are applied, it cannot exhibit sufficient durability.

[0004]

The lower limit of the temperature for synthesizing aluminum titanate is 1280°C, while the lower limit of the temperature for synthesizing magnesium titanate is 900°C. Both are unstable in the temperature region lower than their synthesizing temperatures. A solid solution of these compounds, aluminum magnesium titanate is unstable at a temperature lower than the synthesizing temperature region as well as aluminum titanate and magnesium titanate, and thus is tend to thermally decompose into TiO_2 (rutile) and MgAl_2O_4 (spinel) when continuously used in the decomposition temperature range for a long time. Herein, the decomposition

temperature range of aluminum magnesium titanate differs depending on the dissolving ratio of aluminum titanate and magnesium titanate, but is normally within the temperature range of about 800-1280°C. For example, a
5 sintered body of aluminum magnesium titanate in which aluminum titanate and magnesium titanate are dissolved at an approximately equivalent molar ratio, when continuously used for a long period in a temperature range of about 1100°C, thermally decomposes into TiO₂
10 (rutile) and MgAl₂O₄ (spinel) (see, for example, Non-Patent Publication 1). For this reason, a sintered body of aluminum magnesium titanate is disadvantageous in that it cannot be continuously used in such a decomposition temperature range.

15 [0005]

[Non Patent Publication 1]

Vincenzo Buscaglia et al. "Decomposition of Al₂TiO₅ and Al₂(1-x)Mg_xTi_(1+x)O₅ Ceramics", Journal of American Ceramic Society, 1998, 81 [10], pp.2645-2653.

20 [0006]

[Problem to Be Solved by the Invention]

A primary object of the present invention is to provide a sintered body of aluminum magnesium titanate having excellent mechanical strength and stability in
25 continuous use at high temperatures, as well as

inherently low thermal expansibility of sintered body of aluminum magnesium titanate.

[0007]

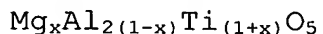
[Means for solving the problem]

5 The inventors of the present invention carried out extensive research to overcome the foregoing problems of known art. They consequently found that an aluminum magnesium titanate-based sintered body having high mechanical strength, a low coefficient of thermal
10 expansion, excellent decomposition resistance and fire resistance can be obtained by using a raw material mixture prepared by adding a specific alkali feldspar to a mixture comprising an Mg-containing compound, an Al-containing compound and a Ti-containing compound. The
15 present invention was accomplished on the basis of this finding.

[0008]

Specifically, the present invention provides the following processes for producing an aluminum
20 magnesium titanate-based sintered body:

1. A process for producing a sintered body comprising as a basic component aluminum magnesium titanate represented by the composition formula:



25 wherein the value of x is $0.25 \leq x < 0.75$,

the process comprising the step of sintering a formed product from a raw material mixture comprising 100 parts by weight, calculated on an oxide basis, of a mixture comprising an Mg-containing compound, an Al-containing compound and a Ti-containing compound at the same metal component ratio as the metal component ratio of Mg, Al and Ti in the composition formula, and 1-10 parts by weight of an alkali feldspar represented by the composition formula:



wherein the value of y is $0 \leq y \leq 1$ at a sintering temperature of 1000-1700°C.

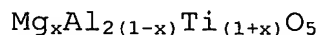
2. An aluminum magnesium titanate-based sintered body obtainable by the process of Item 1.

15 [0009]

[Mode for Carrying out the Invention]

The process of the invention is a process for producing a sintered body comprising as a basic component aluminum magnesium titanate represented by the

20 composition formula:

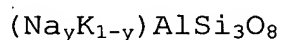


wherein the value of x is $0.25 \leq x < 0.75$,

the process comprising the step of sintering a formed product from a raw material mixture comprising 100 parts by weight, calculated on an oxide basis, of a mixture

25

comprising an Mg-containing compound, an Al-containing compound and a Ti-containing compound at the same metal component ratio as the metal component ratio of Mg, Al and Ti in the composition formula, and 1-10 parts by weight of an alkali feldspar represented by the composition formula:



wherein the value of y is $0 \leq y \leq 1$ at a sintering temperature of 1000-1700°C

10 [0010]

Any Mg-containing compound, Al-containing compound and Ti-containing compound can be used as a raw material without limitation insofar as it is a substance which can synthesize aluminum magnesium titanate by sintering. As an Mg-containing compound, an Al-containing compound and a Ti-containing compound, a different compound may be used for each, or a compound comprising two or more of the metal components may be used. These compounds used can be normally suitably selected from those used as a raw material for forming ceramics such as alumina ceramics, titania ceramics, magnesia ceramics, aluminum titanate ceramics, magnesium titanate ceramics, spinel ceramics, aluminum magnesium titanate ceramics and the like. For example, Al_2O_3 , TiO_2 , MgO , and like oxides; MgAl_2O_4 , Al_2TiO_5 , various oxide having spinel-structures

comprising Mg and Ti, and like complex oxides comprising two or more types of metal components; compounds (carbonates, nitrates, sulfates, etc.) comprising one or more types of metal components selected from the group
5 consisting of Al, Ti and Mg; among others, can be used.

[0011]

Mg-, Al- and Ti-containing compounds can be mixed at such a ratio that the ratio of the metal components contained in these compounds is the same ratio
10 as that of the metal components Mg, Al and Ti in the above aluminum magnesium titanate represented by the composition formula: $Mg_xAl_{2(1-x)}Ti_{(1+x)}O_5$ (wherein $0.25 \leq x < 0.75$). By using the above compounds in such a proportion, it is possible to obtain a sintered body
15 comprising as a basic component an aluminum magnesium titanate which has the ratio of the metal components equal to the ratio of the metal components in a mixture used as a raw material.

[0012]

20 In the present invention, it is necessary to further add an alkali feldspar as an additive to the above mixture comprising an Mg-containing compound, an Al-containing compound and a Ti-containing compound.

[0013]

25 Alkali feldspar used herein as an additive is a

sintering aid for aluminum magnesium titanate, serves to add an Si component to aluminum magnesium titanate, and is represented by the composition formula: $(Na_yK_{1-y})AlSi_3O_8$. In the above composition formula, the value of y is preferably $0.1 \leq y \leq 1$, and more preferably $0.15 \leq y \leq 0.85$. The alkali feldspar with the value of y in this range has a low melting point, and is particularly effective in promoting sintering of aluminum magnesium titanate.

[0014]

10 The amount of an alkali feldspar used may be about 1-10 parts by weight, preferably about 3-5 parts by weight, relative to 100 parts by weight, calculated on an oxide basis, of the total amount of the Mg-, Al- and Ti-containing compounds used as raw materials. The total
15 amount of raw material compounds in this case may refer to the weight of a raw material mixture before main sintering that has been subjected to heat treatment to remove moisture and organic matter contained therein and, if necessary, to pre-sintering.

20 [0015]

 According to the present invention, the above specific alkali feldspar is added to a mixture comprising an Mg-containing compound, an Al-containing compound and a Ti-containing compound as an additive and this mixture
25 is formed into a predetermined shape to be sintered,

whereby an sintered body of aluminum magnesium titanate with high mechanical strength and resistance to thermal decomposition can be obtained.

[0016]

5 The reason the sintered body with high mechanical strength and resistance to thermal decomposition can be obtained by the process of the present invention is undetermined, but is presumably as follows:

10 [0017]

 In the process of the present invention, due to the use of alkali feldspar that becomes in the liquid state around a temperature at which aluminum magnesium titanate is synthesized, a reaction which synthesizes
15 aluminum magnesium titanate is caused in the liquid phase, forming a compact sintered body. Because this additive has been dissolved into aluminum magnesium titanate in the first sintering step, the additive does not become liquid when heating again after ceramics formation. The
20 strength of the ceramics is therefore not lowered. In addition, when an Si component contained in an alkali feldspar dissolves into the aluminum magnesium titanate crystal lattice in sintering step for synthesizing aluminum magnesium titanate, it dissolves preferentially
25 into the crystal system of aluminum titanate rather than

into the crystal system of magnesium titanate. This is because aluminum titanate has greater distortion in the octahedron structure constituting the crystal than magnesium titanate among pseudobrookite type crystal structures, and hence the crystallographic anisotropy is significantly high and crystal structure is unstable. Therefore, Si dissolving into aluminum magnesium titanate crystal lattice dissolves into the crystal system of aluminum titanate, and occupies mainly the Al sites. At this time, tetravalent Si, instead of solely replacing the Al sites which originally keep their electrical charge balance by being trivalent, make pairs with divalent Mg present in the system to be sexivalent with both Si and Mg in total and replace the neighboring two Al atoms (sexivalent in total) more easily. This can be also explained from the correlation of the ion radius of each cation. That is, since the ion radii of Si^{4+} and Mg^{2+} are 0.54Å and 0.86Å, respectively, and the mean ion radius of them is thus 0.70Å, which is approximate to the ion radius of Al^{3+} , 0.68Å. Accordingly, the occupation of the Al sites by the pair of Si and Mg can be thought to be a dissolving state more reasonable in energy than replacing solely by Si. Thus, it is considered that aluminum magnesium titanate can inhibit the ion diffusion between the cations even at high temperatures by the use

of Si and Mg in combination, thus having a stable crystal structure.

[0018]

From the reasons mentioned above, the obtained
5 aluminum magnesium titanate-based sintered body is
thought to show improved mechanical strength and very
high resistance to thermal decomposition due to
stabilization of the crystal structure.

[0019]

10 A raw material mixture prepared by adding
alkali feldspar to a mixture comprising an Mg-containing
compound, an Al-containing compound and a Ti-containing
compound may be sufficiently mixed and pulverized to an
appropriate grain size, and then formed into a
15 predetermined shape.

[0020]

The mixing and pulverizing process of the raw
material mixture is not particularly restricted and may
be conducted according to a known method. For example,
20 mixing and pulverizing can be conducted by using a ball
mill, stirred media mill, etc.

[0021]

The degree of pulverization of the raw material
mixture is not particularly limited. It is normally
25 pulverized to the grain size of about 1 μm or less,

preferably to as small grain size as possible, as long as secondary particles are not formed.

[0022]

A forming aid, if necessary, may be further
5 added to the raw material mixture. As a forming aid, a known substance which has been used may be used depending on the forming process.

[0023]

As such a forming aid, for example, polyvinyl
10 alcohol, microwax emulsion, carboxymethyl cellulose and like binders, stearic acid emulsion and like mold releasing agents, n-octyl alcohol, octylphenoxy ethanol and like antifoaming agents, diethylamine, triethylamine and like deflocculants can be used.

15 [0024]

The amount of a forming aid used is not particularly limited either, and may be suitably selected from the range of amounts for a known one depending on the forming process. For example, when forming is
20 conducted by slip casting, it is possible to use about 0.2-0.6 parts by weight of a binder, about 0.5-1.5 parts by weight of a deflocculant, about 0.2-0.7 parts by weight of a mold releasing agent (solid basis), and about 0.5-1.5 parts by weight of an antifoaming agent, relative
25 to 100 parts by weight, calculated on an oxide basis, of

the total amount of the Mg-, Al- and Ti-containing compounds used as raw materials.

[0025]

The forming process of the raw material mixture
5 is not particularly limited, and, for example, press
molding, sheet casting, slip casting, extrusion,
injection molding, CIP molding and like known forming
processes may be suitably employed.

[0026]

10 The sintering temperature may be any
temperature which is necessary for aluminum magnesium
titanate to be synthesized. Normally, it may be about
1000-1700°C, preferably about 1250-1450°C.

[0027]

15 The atmosphere for sintering is not
particularly limited, and may be any of an oxygen-
containing atmosphere such as air, a reducing atmosphere
and an inert atmosphere, which are heretofore employed.

[0028]

20 The sintering time is not particularly limited,
and may be such that the formed product is sufficiently
sintered, depending on the shape of the formed product,
etc. Normally, the product may be maintained in the above
temperature range for about 1-10 hours.

25 [0029]

The heating rate and cooling rate in sintering are not particularly limited, and may be suitably selected so that no cracks are formed in the sintered body. For example, to sufficiently remove water, organic binder and the like contained in the raw material, it is preferable to raise the temperature not abruptly but gradually. In addition, prior to heating to the above sintering temperature, if necessary, by carrying out calcination by slowly heating in a temperature range of about 700-1000°C for about 10-30 hours, when aluminum magnesium titanate is synthesized, the stress in the sintered body, which causes cracks, can be mitigated to inhibit the formation of cracks, providing a compact and uniform sintered body.

[0030]

The sintered body of aluminum magnesium titanate obtained by the process of the present invention is a sintered body which comprises the aluminum magnesium titanate represented by the above composition formula:
$$\text{Mg}_x\text{Al}_{2(1-x)}\text{Ti}_{(1+x)}\text{O}_5$$
 (wherein the value of x is $0.25 \leq x < 0.7$) as a basic component and in which the Si component contained in the alkali feldspar as an additive is dissolved into the crystal lattice of aluminum magnesium titanate. Such a sintered body has excellent resistance to thermal decomposition because it has both high

mechanical strength and low coefficient of thermal expansion and its crystal structure is stabilized. As a result, the thermal decomposition reaction of aluminum magnesium titanate is inhibited and therefore the sintered body can be stably used at a temperature ranging from room temperature to as high as about 1600°C. The mechanical strength is very high compared to a conventional sintered body of aluminum magnesium titanate as it can have mechanical strength up to about 70 MPa.

10 [0031]

Furthermore, according to the process of the present invention, sintering can be conducted without forming cracks, providing a compact sintered body. Accordingly, the obtained sintered body is given good resistance to thermal shock and corrosion resistance.

[0032]

Using the above excellent characteristics, the sintered body of aluminum magnesium titanate obtained by the process of the present invention can be used as, for example, an automobile exhaust filter, an automobile exhaust filter for DPF (diesel particulate filter) apparatus, etc. Further, using its low thermal expansibility, it can also be effectively used as a surface plate for printing process in the LSI manufacturing process, etc. It can also be applied for

the furnace walls of high-temperature furnaces and the furnace walls of refuse incinerators etc.

[0033]

[Effect of the invention]

5 The sintered body of aluminum magnesium titanate obtained by the preparation processes of the present invention has high mechanical strength and resistance to thermal decomposition, while maintaining the inherently low coefficient of thermal expansion of
10 aluminum magnesium titanate, and can be stably used in the temperature range of 800°C-1280°C in which a known sintered body of aluminum titanate cannot be used for a long period continuously. In addition, the aluminum magnesium titanate-based sintered body also has good
15 refractoriness, and can be used in a high temperature range of 1500°C or higher in which magnesium titanate cannot be used.

[0034]

[Examples]

20 The present invention is described below in more details with reference to Examples.

[0035]

Example 1

 To 100 parts by weight of a mixture comprising
25 26.7% by weight (20 mol%) of sinterable α -alumina, 62.8%

by weight (60 mol%) of titanium oxide in anatase form and 10.5% by weight (20 mol%) of a natural mineral, magnesium oxide in periclase form, were added 4 parts by weight of an alkali feldspar represented by the chemical
5 formula : $(\text{Na}_{0.6}\text{K}_{0.4})\text{AlSi}_3\text{O}_8$, 0.25 parts by weight of polyvinyl alcohol as a binder, 1 part by weight of diethylamine as a deflocculant, and 0.5 parts by weight of polypropylene glycol as an antifoaming agent. The mixture was mixed using a ball mill for 3 hours, and then
10 dried using a dryer at 120°C for at least 12 hours, giving a raw material powder.

[0036]

The resulting raw material powder was pulverized to about 150 mesh and pressed under a pressure
15 of 60 MPa, giving a molded product measuring 100 mm x 100 mm x 10 mm.

[0037]

This molded product was sintered according to heating pattern 1 below in the atmosphere and thereafter
20 left to cool, giving a sintered body of aluminum magnesium titanate.

(Heating pattern 1)

from room temperature to 140°C for 21 hours
maintained at 140°C for 14 hours (water evaporation)
25 from 140 to 216°C for 21 hours (gradual evaporation of

water inside the sample)

from 216 to 295°C for 16 hours (organic binder
combustion)

5 from 295 to 379°C for 46 hours (magnesium hydroxide
removal)

from 379 to 458°C for 20 hours (organic binder
combustion)

from 458 to 700°C for 28 hours (residual carbon
combustion)

10 maintained at 700°C for 3 hours

from 700 to 1000°C for 26 hours (calcination)

from 1000 to 1250°C for 2 hours

maintained at 1250°C for 2 hours (sintering)

15 A 3 mm x 4 mm x 40 mm sample was cut from the
sintered body of aluminum magnesium titanate obtained by
the above process. The surface of the sample was polished
and the arris of the sample was ground (removal of sharp
edges), and then its three-point bending strength was
20 determined. As a result, the three-point bending strength
was 69.3±3.1 MPa.

[0038]

As Comparative Example 1, a sintered body of
aluminum magnesium titanate was obtained in the same
25 manner as the above process except that no alkali

feldspar was added. The three-point bending strength of this sintered body was determined in the same process. The result was 21.1 ± 2.1 MPa.

[0039]

5 It can be seen from these results that the aluminum magnesium titanate-based sintered body obtained by the process of the present invention has very high mechanical strength compared to a known aluminum magnesium titanate-based sintered body.

10 [0040]

Example 2

To 100 parts by weight of a mixture comprising 37.3% by weight (25 mol%) of an oxide having a spinel structure and represented by the chemical formula MgAl_2O_4 and 62.7% by weight (75 mol%) of titanium oxide in anatase form were added 4 parts by weight of an alkali feldspar represented by the chemical formula $(\text{Na}_{0.6}\text{K}_{0.4})\text{AlSi}_3\text{O}_8$, 0.25 parts by weight of polyvinyl alcohol as a binder, 1 part by weight of diethylamine as a deflocculant and 0.5 parts by weight of polypropylene glycol as an antifoaming agent. The mixture was mixed using a ball mill for 3 hours, and then dried using a dryer at 120°C for at least 12 hours, giving a raw material powder.

25 [0041]

The resulting raw material powder was pulverized to about 150 mesh and pressed under a pressure of 60 MPa, giving a molded product measuring 100 mm x 100 mm x 10 mm.

5 [0042]

This molded product was sintered in the atmosphere according to heating pattern 2 below and then left to cool, giving an aluminum magnesium titanate-based sintered body.

10 (Heating pattern 2)

from room temperature to 140°C for 21 hours

maintained at 140°C for 14 hours (water evaporation)

from 140 to 216°C for 21 hours (gradual evaporation of water inside the sample)

15 from 216 to 295°C for 16 hours (organic binder combustion)

from 295 to 379°C for 46 hours (magnesium hydroxide removal)

20 from 379 to 458°C for 20 hours (organic binder combustion)

from 458 to 700°C for 28 hours (residual carbon combustion)

maintained at 700°C for 3 hours

from 700 to 1000°C for 26 hours (calcination)

25 from 1000 to 1400°C for 3 hours

maintained at 1400°C for 4 hours (sintering)

The three-point bending strength of the resulting aluminum magnesium titanate-based sintered body was determined in the same manner as Example 1. The result was 28.2±1.7 MPa.

[0043]

In contrast, As Comparative Example 2, a sintered body of aluminum magnesium titanate was obtained in the same manner as the above process except that no alkali feldspar was added. The three-point bending strength of this sintered body was determined by the same process. The result was 9.6±0.6 MPa.

[0044]

It can be seen from these results that the aluminum magnesium titanate-based sintered body obtained by the process of the present invention has very high mechanical strength compared to a known aluminum magnesium titanate-based sintered body.

[0045]

Meanwhile, a 5 mm x 5 mm x 20 mm sample was cut from each of the aluminum magnesium titanate-based sintered body of Example 2 and the sintered body of Comparative Example 2. After the surfaces of the samples were polished, the coefficients of thermal expansion of

the samples were determined at the heating rate of 20°C/min. The results are shown in Table 1 below.

[0046]

[Table 1]

Example 2 Aluminum magnesium titanate with additive		
Temperature °C	Percentage of thermal expansion ($\Delta L/L$) %	Coefficient of thermal expansion $\times 10^{-06} (1/K)$
50	0.002	0.57
150	0.007	0.52
250	0.017	0.76
350	0.033	0.99
450	0.051	1.18
550	0.073	1.38
650	0.1	1.59
750	0.138	1.9
850	0.191	2.3
Comparative Example 2 Aluminum magnesium titanate with no additive		
Temperature °C	Percentage of thermal expansion ($\Delta L/L$) %	Coefficient of thermal expansion $\times 10^{-06} (1/K)$
50	-0.001	-0.44
150	-0.003	-0.2
250	0.001	0.04
350	0.005	0.16
450	0.015	0.36
550	0.029	0.55
650	0.045	0.72
750	0.07	0.97
850	0.109	1.32

[0047]

As can be seen from the results shown above,
the aluminum magnesium titanate-based sintered body
obtained in Example 2 has a very low coefficient of
thermal expansion as the sintered body of aluminum
5 magnesium titanate obtained in Comparative Example 2.
This demonstrates that the sintered body in Example 2
maintains inherently low thermal expansibility of
aluminum magnesium titanate.

[0048]

10 Next, a 10 mm x 10 mm x 10 mm samples was cut
from each of the aluminum magnesium titanate-based
sintered body of Example 2 and the sintered body of
aluminum magnesium titanate of Comparative Example 2. The
samples were placed in the atmosphere at 1100°C and their
15 changes of residual aluminum magnesium titanate
percentage $\alpha(\%)$ over time were determined.

[0049]

The residual aluminum magnesium titanate
percentage was determined by X-ray diffraction
20 measurement (XRD) by the following manner.

[0050]

First, since MgAl_2O_4 (spinel) and TiO_2 (rutile)
are formed when aluminum magnesium titanate thermally
decomposes, the ratio R of the diffraction intensity of
25 aluminum magnesium titanate to that of rutile was

determined by the formula below using the integrated intensity ($I_{\text{TiO}_2(110)}$) of the diffraction peak of the (110) face of rutile and the integrated intensity ($I_{\text{MAT}(023)}$) of the diffraction peak of the (023) face of aluminum

5 magnesium titanate:

[0051]

$$R = I_{\text{MAT}(023)} / \{ I_{\text{MAT}(023)} + I_{\text{TiO}_2(110)} \}$$

Further, the ratio R_0 of the diffraction intensity of aluminum magnesium titanate to that of rutile for the sintered body prior to conducting heat treatment at 1100°C was also determined by the same manner.

[0052]

Second, using R and R_0 determined by the above manner, the residual aluminum magnesium titanate percentage $\alpha(\%)$ was determined by the following formula:

[0053]

$$\alpha = (R/R_0) \times 100$$

The changes of the residual aluminum magnesium titanate percentage $\alpha(\%)$ of the sintered bodies of Example 2 and Comparative Example 2 over time are shown in a graph of Fig. 1.

[0054]

As can be seen from Fig. 1, the sintered body of aluminum magnesium titanate of Example 2 can maintain

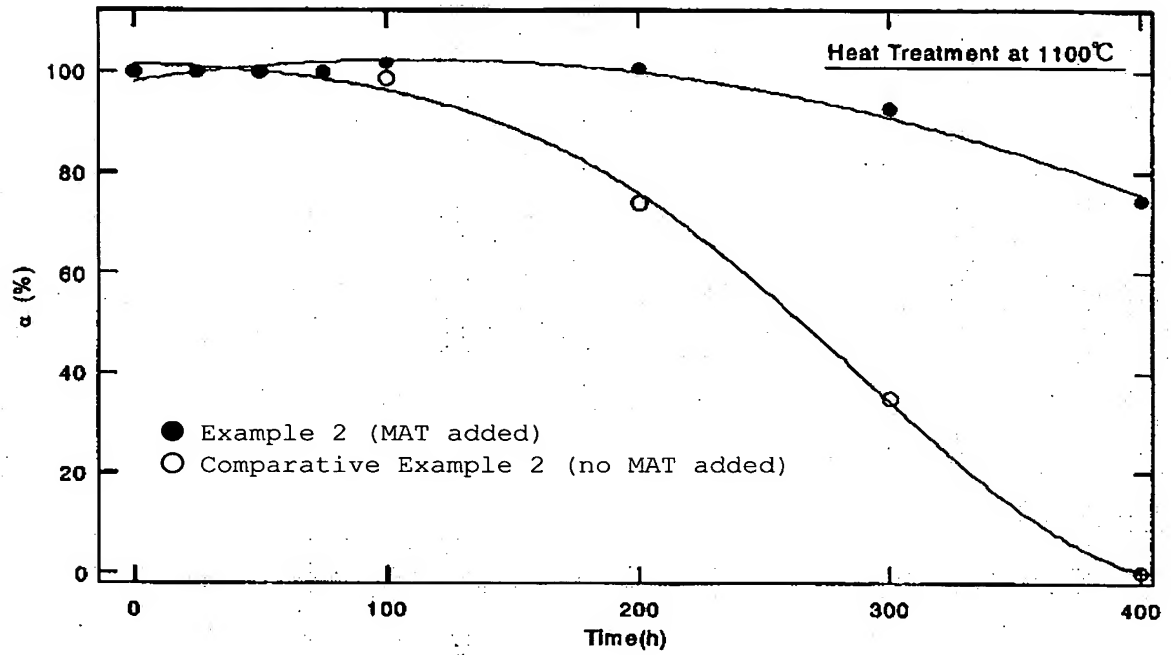
a high value of the residual aluminum magnesium titanate percentage for a long period, compared with the sintered body of aluminum titanate of Comparative Example 2 obtained without adding an alkali feldspar, when left
5 under a high temperature condition of 1100°C. It can be known from this result that the sintered body of Example 2 has excellent resistance to thermal decomposition.

[Brief Description of the Drawings]

[Figure 1] A graph showing the change of
10 residual aluminum magnesium titanate percentage $\alpha(\%)$ over time in the sintered bodies obtained in Example 2 and Comparative Example 2 placed in the atmosphere at 1100°C.

[Document Name] Drawings

[Figure 1]



[Document Name] Abstract

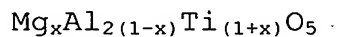
[Abstract]

[Object]

An object of the invention is to provide a
5 sintered body of aluminum magnesium titanate having
excellent mechanical strength and stability in continuous
use at high temperatures, as well as inherently low
thermal expansibility of sintered body of aluminum
magnesium titanate.

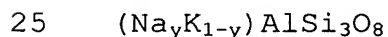
10 [Method for Achieving the Object]

A process for producing a sintered body
comprising as a basic component aluminum magnesium
titanate represented by the composition formula:



15 wherein the value of x is $0.25 \leq x < 0.75$,

the process comprising the step of sintering a
formed product from a raw material mixture comprising 100
parts by weight, calculated on an oxide basis, of a
mixture comprising an Mg-containing compound, an Al-
20 containing compound and a Ti-containing compound at the
same metal component ratio as the metal component ratio
of Mg, Al and Ti in the composition formula, and 1-10
parts by weight of an alkali feldspar represented by the
composition formula:



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wherein the value of y is $0 \leq y \leq 1$ at a sintering temperature of 1000-1700°C.

[Selected Figure] Figure 1